industrial productivity

How do all these aerospace spinoffs work? And which industrial companies and NASA centers are making them happen?

The technology underlying many of the current spinoffs in the first section and other ongoing programs are described here in more technical detail under categories in Construction, Transportation, Energy, Industrial Productivity, Safety, Medical Instrumentation, Medical Systems, Pollution Control, Natural Resources, and Recreation. These stories reflect the direction of NASA's Technology Utilization Office. They are examples of NASA's continuing efforts at the beginning of 1976 to spin off technology from the space program to industrial and commercial usage, for the benefit of all Americans.

Programing for design

Structures under stress are designed much more rapidly—allowing for remarkable increases in productivity—since NASTRAN (for NASA Structural Analysis) has become available. The versatile computer program, written originally to help design more efficient space vehicles, finds additional applications each year.

Use of the program has been estimated to result in a 60% improvement in predicting the behavior of stressed components and a two-thirds cut in calculation time.

Because it can be used to analyze both dynamic and static behavior of elastic structures under a wide range of loading conditions—with more than 65,000 degrees of freedom—the program is adaptable for structures of any size, shape, or purpose.

For example, the automotive industry uses the program to design front suspension systems and steering linkages. Railroad tracks and cars are designed with NASTRAN. It's also used in designing bridges, power plants, skyscrapers, aircraft, and—round robin—now the space shuttle.

A recent use of NASTRAN has enabled Pullman-Standard Inc. to simulate the dynamic behavior of rugged railroad cars for bulk commodity transport.

By far the most widely used computer program to emerge from the space program, NASTRAN helps analyze the behavior of elastic structures of any size, shape, or purpose, such as the hopper car below. This one program alone has been estimated to return $701-million in cost savings from 1971 to 1984.